

1 What is claimed is:

2 1. A fastener which is to be attached to at least one
3 material sheet, said fastener comprising a filament portion and at least
4 one bulged massive end portion on a selected end portion of said
5 filament portion, said bulged massive end portion having a maximum
6 length in at least two directions perpendicular to an axis direction of
7 said filament portion separated by an angle large enough that the
8 outer surface of the end portion measured between the two directions
9 is larger than the diameter of said filament portion, and further
10 wherein said bulged massive end portion can be engaged with one
11 surface of the material sheet, said surface of the material sheet being
12 opposite an opposing surface thereof through which said filament
13 portion is inserted.

14 2. A fastener according to claim 1, wherein said
15 bulged massive portions are provided on both end portions of said
16 filament, respectively.

17 3. A fastener according to claim 1, wherein a tag
18 holding portion is provided at another end of said filament portion
19 opposite to said end to which said bulged massive portion is
20 connected.

21 4. A fastener according to claim 1, wherein said
22 bulged massive portion has a configuration selected from a group
23 consisting a spherical configuration, a semi-spherical configuration, a
24 cone like configuration, a pyramid type configuration, a truncated
25 cone, a polygonal sphere, a polygonal semi-sphere, and an ellipsoid
26 configuration.

27 5. A fastener according to claim 4, wherein said
28 bulged massive portion has a part opposed to said surface of said
29 material sheet to which said bulged massive portion would be engaged

1 and on which at least one frictional element against said surface of
2 said material sheet, is provided.

3 6. A fastener according to claim 5, wherein said
4 frictional element is selected from a group consisting a groove, a
5 concaved portion, a convexed portion, a projecting member projected
6 from said surface of said bulged massive portion, a flat like portion,
7 and a blade like portion.

8 7. A fastener according to claim 1, wherein said
9 filament portion has a length suitable for attachment to an applied
10 good.

11 8. A fastener according to claim 1 wherein said bulged
12 massive end portion is compressible.

13 9. A fastener assembly in which a plurality of said
14 fasteners as defined by claim 1, are arranged adjacent to each other,
15 so that each one of said filament portions of said individual fasteners
16 are arranged in parallel to each other.

17 10. A fastener assembly according to claim 9, wherein
18 at least one of said bulged massive portions of each one of said
19 fasteners are simultaneously connected to a rail.

20 11. A fastener assembly according to claim 10, wherein
21 said bulged massive portions are provided on both end portions of
22 said filament, and both of said bulged massive portions provided at
23 both end portions of said filament portion of said respective fasteners
24 are simultaneously connected to first and second rails, respectively,
25 said first and second rails being arranged parallel to each other.

26 12. A fastener assembly according to claim 9, wherein
27 a tag holding portion is provided at another end of said filament
28 portion opposite to said end to which said bulged massive portion is
29 connected, and each one of said bulged massive portions provided on
30 one end portion of said respective filament portions of a plurality of
31 fasteners is simultaneously connected to a first rail, while each one of

1 said tag holding portions provided on another end portion of said
2 respective filament portions of a plurality of fasteners is
3 simultaneously connected to a second rail.

4 13. A fastener assembly according to claim 12, wherein
5 either one of said bulged massive portions or said tag holding
6 portions are connected to said respecting connecting bar via a
7 connecting portion provided on said rail.

8 14. A fastener assembly according to claim 13, wherein
9 said connecting portions have a configuration in that a diameter
10 thereof is gradually reduced from a bottom portion thereof directly
11 connected to said connecting bar to a contacting area formed on either
12 one of a surface of said bulged massive portion or said tag holding
13 portion.

14 15. A fastener assembly according to claim 14, wherein
15 said connecting portion is connected to a surface of either one of said
16 bulged massive portion or said tag holding portion through a point
17 contacting portion.

18 16. A fastener assembly according to claim 10, wherein
19 at least one of said rails is provided with an indexing system.

20 17. A fastener assembly according to claim 16, wherein
21 said indexing system is selected from a group consisting a concaved
22 portion, a projected portion and a hole portion each being formed on a
23 surface of said rails.

24 18. A fastener assembly according to claim 9, wherein
25 at least one of said rails is formed on a surface formed by said
26 plurality of filament portions of said fasteners.

27 19. A fastener assembly according to claim 9, wherein
28 at least one of said rails is formed over a surface formed by said
29 plurality of filament portions of said fasteners, with a certain distance.

1 20. A fastener assembly according to claim 9, wherein
2 all portions of said fastener assembly are integrally formed into one
3 body with the same material.

4 21. A fastener attaching device for shooting unit
5 fasteners one by one utilizing a fastener assembly in which a plurality
6 of unit fasteners each having a filament portion and at least one
7 bulged massive portion provided on at least one end portion of the
8 filament portion, each one of the plurality of fasteners being
9 adjacently arranged to each other, so that each one of the filament
10 portions are arranged parallel to each other, wherein at least one of
11 the bulged massive portions of each one of the fasteners is
12 simultaneously connected to a rail, said fastener attaching device
13 comprising

14 a main body,
15 an operating lever,
16 at least one hollow needle provided on an end portion of
17 said main body,

18 a pushing pin passage,
19 a pushing pin which slides through said pushing pin
20 passage back and forth in response to an operation of said operating
21 lever,

22 a bulged massive portion gripping means,
23 a bulged massive portion supply path for moving the
24 bulged massive portion of the fastener assembly, provided at a
25 position with a predetermined angle with respect to said pushing pin
26 passage,

27 a rail moving passage provided inside said main body
28 parallel to said bulged massive portion supply path, and

29 a bulged massive portion supply means for supplying one
30 of said bulged massive portions to said pushing pin passage in
31 response to an operation of said operation lever.

1 22. A fastener attaching device according to claim 21,
2 wherein an inside diameter of said hollow needle is substantially
3 identical to or minimally larger than an external diameter of said
4 bulged massive portion.

5 23. A fastener attaching device according to claim 21,
6 wherein said bulged massive portion gripping means is provided with
7 a portion for covering at least a part of a surface of said bulged
8 massive portion and has a space inside for accepting a part of said
9 surface of said bulged massive portion part therein.

10 24. A fastener attaching device according to claim 21,
11 wherein said bulged massive portion supply means supplies a bulged
12 massive portion to said pushing pin passage before said bulged
13 massive portion gripping means, which is provided at an end portion
14 of said pushing pin or a tip portion of the pushing pin, passing by said
15 intercrossing portion formed between said bulged massive portion
16 supply passage and said pushing pin passage in response to an
17 operation of said operation lever in the vicinity of said bulged
18 massive portion supply means.

19 25. A fastener attaching device according to claim 21,
20 wherein a connecting portion cutting means for cutting a connecting
21 portion connecting said bulged massive portion to said rail in
22 response to an operation of said operation lever, is provided in the
23 vicinity of said bulged massive portion supply means.

24 26. A fastener attaching device according to claim 21,
25 wherein at least a part of said bulged massive portion gripping means,
26 a connecting portion cutting means for cutting a connecting portion
27 connecting said bulged massive portion to said rail in response to an
28 operation of said operation lever, is provided.

29 27. A fastener attaching device according to claim 24,
30 wherein said bulged massive portion gripping means and said pushing
31 pin perform respective sliding motions different from each other.

1 28. A fastener attaching device according to claim 21,
2 wherein the fastener assembly has a plurality of unit fasteners each
3 comprising a filament portion and two bulged massive portions
4 provided at both end portions of said filament portion, and each one
5 of the plurality of said fasteners are adjacently arranged to each other,
6 so that each one of said filament portions thereof are arranged parallel
7 to each other, and further wherein said device is provided with a pair
8 of said hollow needles, a pair of said pushing pins, a pair of said
9 pushing pin passages, a pair of said bulged massive portion gripping
10 means, a pair of said bulged massive portion supply paths, a pair of
11 said rail moving passages and a pair of said bulged massive portion
12 supply means.

13 29. A fastener attaching device according to claim 27,
14 wherein when said fastener assembly is to be mounted on said device,
15 said fastener assembly is mounted thereon so that a direction along
16 which each one of said filament portions are arranged is set so as to
17 intercross with said center axis of said pushing pin path at a
18 predetermined angle, wherein said filament portions are longer than
19 the shortest distance between said pushing pin passages.

20 30. A fastener attaching device according to claim 28,
21 wherein said bulged massive portion supply means includes a pair of
22 rotating members each having a plurality of fastener engagement
23 members on a peripheral surface thereof which can engage with a
24 predetermined portion of each one of said unit fasteners or said
25 indexing means provided on said rail, so as to move said unit
26 fasteners by a predetermined distance in a predetermined direction.

27 31. A fastener attaching device according to claim 30,
28 wherein said rotating member comprising a pair of circular plates.

29 32. A fastener attaching device according to claim 30,
30 wherein a common rotating axis of said rotating members intercross

1 in a direction along which each one of said filament portions are
2 arranged, at a non-perpendicular angle.

3 33. A fastener attaching device according to claim 30,
4 wherein a pair of said rotating members are rotated by a common
5 driving member which is driven in response to an operation of an
6 operation lever, the rotating directions of each one of said rotating
7 members being different from each other.

8 34. A fastener attaching device according to claim 27,
9 wherein said pushing pin penetrates through an inside hollow path of
10 said bulged massive portion gripping means.

11 35. A fastener attaching device according to claim 34,
12 wherein a moving range of said pushing pin is larger than that of said
13 bulged massive portion gripping means.

14 36. A fastener attaching device according to claim 34,
15 wherein said pushing pin is connected to a second slider member
16 which is connected in turn to a driving member driven in response to
17 said operation lever while said bulged massive portion gripping
18 means is supported on a first slider means, which being provided with
19 a control means which can contact said second slider means during
20 one time period so that said first slider means can be driven with said
21 second slider means, and can be disconnected from said first slider
22 means during another time period so that said first slider means stops
23 its movement while said second slider means is still moving.

24 37. A fastener attaching device according to claim 36,
25 wherein said control means is provided with a stopper member on a
26 part of said control means which can contact said second slider means
27 during one time period, and said stopper member can engage with a
28 stopper member holding means which can hold said stopper member
29 during another time period.

30 38. A fastener attaching device according to claim 36,
31 wherein said first slider means is further provided with a base plate

- 1 having a hole through space therein through which said second sliding
- 2 means can move along said hole through space when said stopper
- 3 member is disconnected from said second slider member.
- 4